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## The role of prenatal diagnosis in the perinatal management of urinary tract abnormalities

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### 1 Introduction

During the past five years the importance of ultrasonography as a means of prenatal assessment of urinary tract anomalies has become well established [3]. More attention is now being paid to obtaining an early diagnosis in order to distinguish malformations which are not compatible with life from those which could benefit from an appropriate prenatal management protocol in view of a successful outcome after birth [2]. Thus efforts are being made to identify ultrasonographic scans which may serve as guidelines for an early diagnosis and to define the morphological and biochemical aspects of the intrauterine period [1-5]. Thirteen cases of urinary tract anomalies observed during the past three years by means of ultrasonography and the prenatal treatment undertaken are described.

### 2 Materials and methods

The study population consisted of 13 women from 19 to 39 years. In three cases streptococcal infection was revealed during the first trimester; four subjects had oligohydramnios; and one had polydramnios. In one case, genitourinary fetal malformation was associated with maternal diabetes. Ultrasonograms were performed between the 19th and 35th week with a real-time machine, Aloka SSD-202 and 256, equipped with a 3.5 MHz

linear probe. All fetal defects were found during routine ultrasonograms (Tab. I). Only one patient has had a previous neonate affected with a polycystic kidney.

Two fetuses had severe lesions incompatible with postnatal life: atresia of the urethra, megacystitis and ureterohydronephrosis (Fig. 1) in one case. Bilateral renal agenesis was noted in the second case. The parents decided in favor of abortion, and autopsy confirmed the diagnosis.

Two fetuses had a severe dysplastic malformation. One fetus, showing bilateral polycystic kidneys (Fig. 2), terminated in premature labor at the 36th week. The other fetus, with a unilateral (right) multicystic kidney, was born by cesarean section (37th week), and was subsequently subjected to nephrectomy.

Five fetuses had hydronephrosis and hydroureters (two, bilaterally) (Fig. 3). Three fetuses demonstrated slow and incomplete bladder emptying. All 5 cases were ultrasonographically monitored until labor was induced at the 38th week.

Finally two fetuses had an enlarged urinary bladder and delivery was induced at the 36th week, respectively; an enlarged urethra was associated in the first case, completing the diagnosis of prune belly syndrome, whereas radiologic studies revealed the presence of posterior urethral valves in the second one.

Before delivery, pulmonary fetal maturity was established by assaying the amniotic fluid L/S

Tab. I. Sonographic appearance, prenatal management and postnatal diagnosis in 13 patients.

Patient No.	Age	Sonographic Appearance	Prenatal Management	Postnatal Diagnosis and Management
1	28	34 weeks; bilateral hydronephrosis	follow sonograms vaginal delivery at 38 weeks	bilateral vesicoureteral reflux surgery
2	39	30 weeks; bilateral hydronephrosis and hydroureter polyhydramnios	follow sonograms cesarean delivery at 38 weeks	bilateral vesicoureteral reflux surgery
3	19	28 weeks; right hydronephrosis and hydroureter	follow sonograms cesarean delivery at 37 weeks	right vesicoureteral reflux surgery
4	26	35 weeks; right hydronephrosis and hydroureter	follow sonograms cesarean delivery at 3 weeks	right vesicoureteral reflux surgery
5	34	33 weeks; left hydronephrosis and hydroureter	follow sonograms cesarean delivery at 38 weeks	left vesicoureteral reflux surgery
6	26	35 weeks; bilateral polycystic kidney oligohydramnios	follow sonograms vaginal delivery at 36 weeks	neonatal death
7	28	32 weeks; dysplastic kidney	cesarean delivery at 37 weeks	dysplastic kidney surgery
8	20	22 weeks; no visualization of fetal kidneys and bladder even after stimulation with Lasix oligohydramnios	induced abortion at 24 weeks	Anatomical-pathological finding: Potter's Syndrome
9	21	29 weeks; megavesica and megaurethra oligohydramnios	follow sonograms bladder aspiration cesarean delivery at 36 weeks	Prune belly syndrome neonatal death for Candida Septicemia
10	31	19 weeks; megavesical and oligohydramnios	induced abortion at 20 weeks	Anatomical-pathological finding urethral atresia
11	29	33 weeks; megavesica	cesarean delivery at 36 weeks	posterior urethral valves surgery
12	27	35 weeks;	vaginal delivery at 40 weeks	hydrocele surgery
13	30	35 weeks; hydrocele	vaginal delivery at 39 weeks	hydrocele surgery

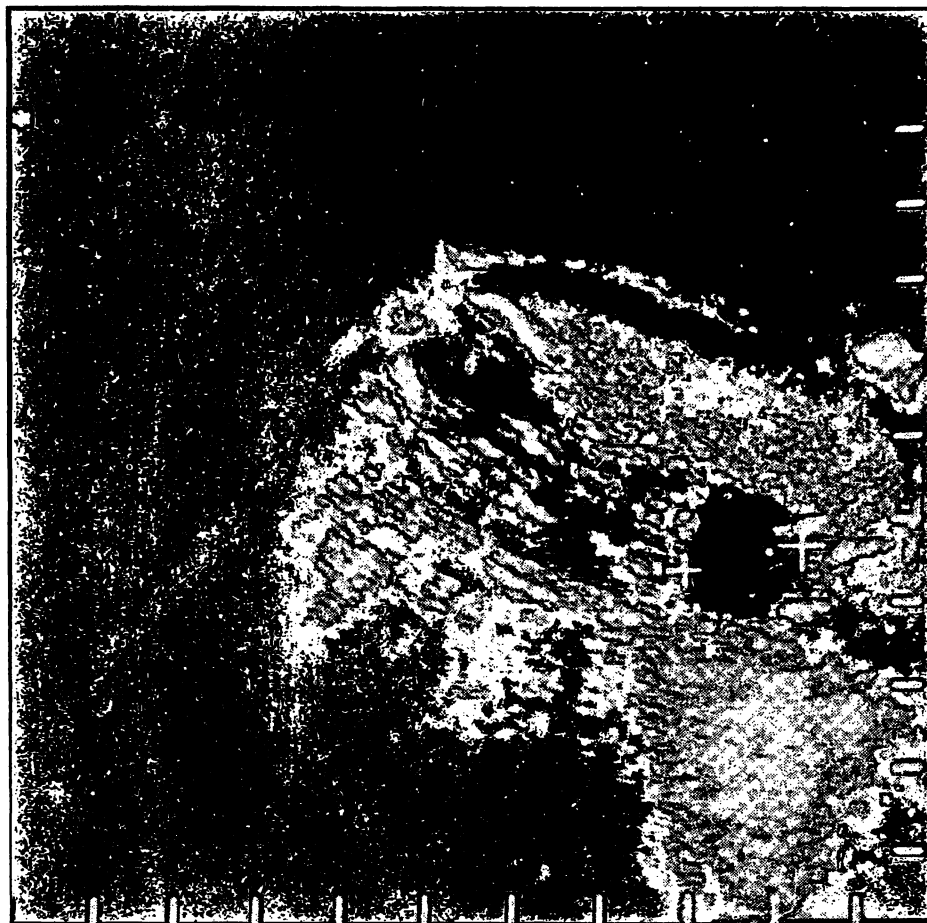


Fig. 1. Megavesica in oligohydramnios for urethral atresia at 22 weeks (see Tab. I, patient No. 10).



Fig. 2. Polycystic kidney. Fetal ascites at 35 weeks (see Tab. I, patient No. 6).

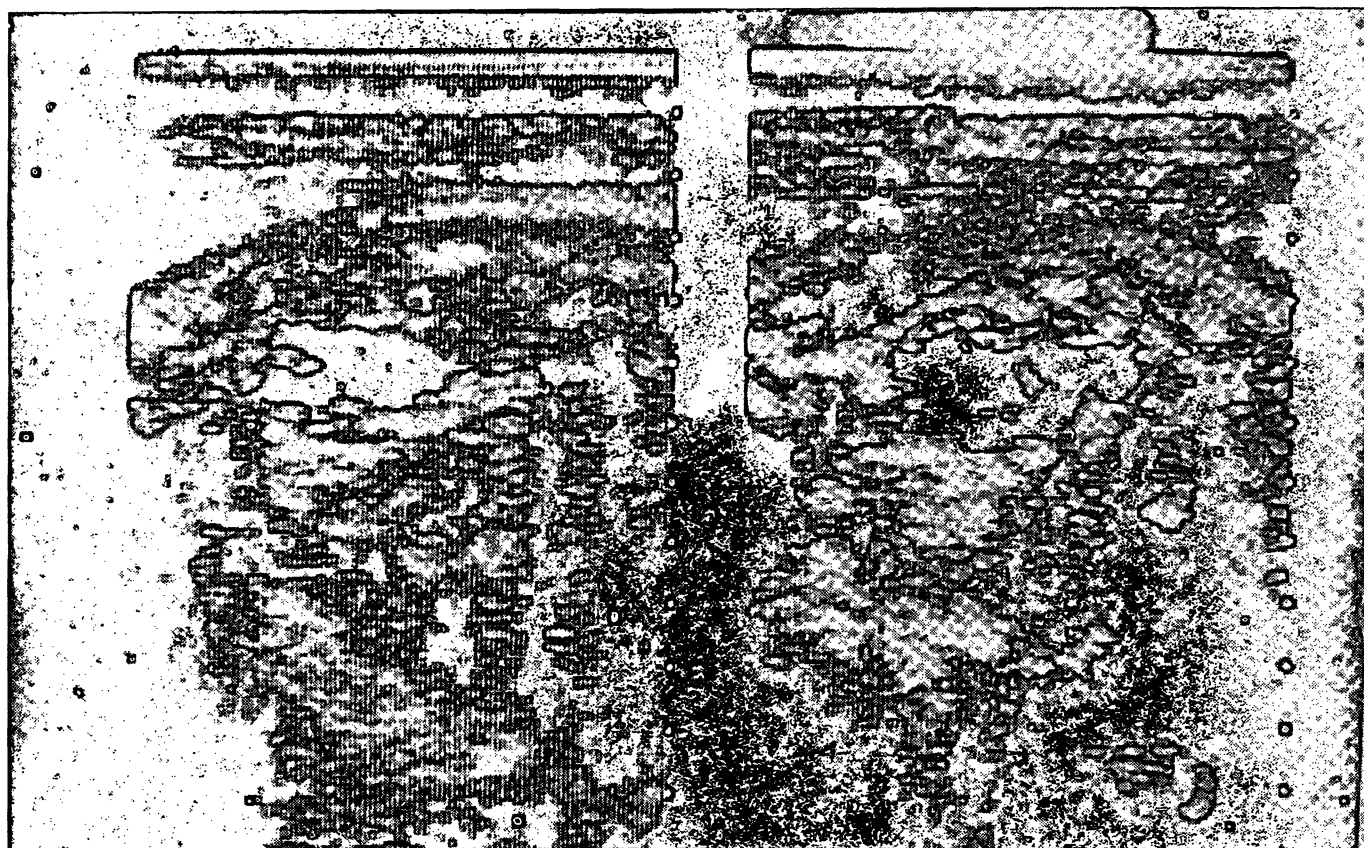


Fig. 3. Bilateral hydronephrosis at 32 weeks (see Tab. I, patient No. 2).

ratio and phosphatidylglycerol levels. Seven women were delivered by cesarean section and four delivered normally.

### 3 Comment

Ultrasonic identification of urinary tract malformations in the fetus is easily performed by well trained individuals. Ultrasonograph the most appropriate and less invasive techniques to achieve this diagnosis. In the presence of urinary tract abnormalities, a more thorough examination of the fetus should be carried out. In fact, in prenatal life these malformations could be associated with others such as the Vater association, Meckel syndrome, Murcs association and oro-facial digital syndrome [8]. The identification of renal dysplasia is the only way of diagnosing the Melnick-Russell syndrome. The time of diagnosis depends on the type of pathology present [1]. Severe dysplastic renal lesions and low obstructions are observed earlier than hydronephrosis and enlarged ureter. In

fact high urinary obstructions are usually detectable ultrasonically in the second trimester, but are mainly noted in the third trimester of pregnancy. Sometimes clinical pictures such as the variation of amniotic fluid are the first signs of urinary malformation [5, 9]. In our experience, oligohydramnios was always associated with a very poor fetal prognosis; on the other hand, polyhydramnios was frequently associated with upper urinary tract obstruction without correlation to fetal prognosis. In the perinatal management of congenital urinary malformation, not only should the character of the amniotic fluid be taken into account, but also the gestational age, the status of fetal development, the L/S amniotic fluid ratio and the potential for intrauterine therapy [4–9]. Taking into consideration the gestational age and genetic counselling, the chromosomic analysis of the amniotic fluid is very useful; the association between renal ectopia, hydronephrosis, polycystic kidney and trisomy of chromosomes 9 and 18 is very frequent. The study of the amniotic fluid, together with measurements of intravescical pres-

sure, analysis of aspirated urine (quantitative and qualitative), and the date of gestation have been the parameters to induce the physician to shunt or not. Among all the cases studied, the fetus with prune belly syndrome was the only case in which urine from the bladder was aspirated using a needle under ultrasonic guidance. This procedure was performed three times during the gestation period [6, 7].

When facing mono- or bilateral obstruction of the upper urinary tract, the type of therapy should be chosen on the basis of the data obtained, with regards to the amount of amniotic fluid present and the intrauterine function of the kidneys. If these parameters are within normal limits, the fetus should be periodically controlled and delivery should be induced once the fetus achieves pulmonary maturity. From our data, we may deduce that the degree of calyco-pyelic dilatation is of no prognostic value to fetal morbidity. Cesarean section was chosen to avoid possible trauma and intracavitary hemorrhage.

Of particular interest are the three cases which had postnatal vesico-ureteral reflux. Prenatal sonograms showed a very slow, retarded and always incomplete evacuation of the bladder. Such cases, lacking evident signs of pathological alterations or neurological disorders, may be classified as dysfunctional syndromes due to local disturbance of innervation.

## Summary

The use of ultrasonography is one of the most appropriate and less invasive techniques for the identification of prenatal assessment of urinary tract anomalies. This technique is able to distinguish malformations which are not compatible with life from those which could benefit from appropriate prenatal management treatment in view of a successful outcome after birth.

During the past three years, 13 cases of urinary tract anomalies were found and treated. On the basis of our experience, we believe that ultrasonography is especially indicated:

- to make an early diagnosis of the type of malformation;

On the basis of our experience we believe that ultrasonography is especially indicated:

- to make an early diagnosis of a malformation which is not compatible with life and as a consequence to induce abortion;
- in the presence of a complex malformation, giving the physician the possibility of showing and explaining to the parents all the aspects involved in reconstructive surgery, which may be very long and tedious and not always followed by optimal results (i.e. spelling estrophy of the bladder). Once knowing the risks, they may decide on whether to keep the child or abort. It is not necessary to underline the importance of early diagnosis in such cases especially in view of the strict laws which are in force in Italy and in other countries;
- to reveal latent malformations, which are normally diagnosed only very late in the pediatric age when damage to the kidney has become irreversible (UPJ obstruction). In these cases postnatal treatment may be efficiently planned. We had two cases of enlarged ureters megaureters in males which were subjected to reconstructive surgery 2 months after birth;
- to prepare the mother for early cesarean section (36th week), thus avoiding the trauma of vaginal delivery in cases of high risk such as fetuses with hydronephrotic kidneys.

- in the presence of a complex malformation, gives the physician the possibility of showing and explaining to the parents all the aspects involved in reconstructive surgery thus giving them the possibility to decide for abortion or not;
- to reveal latent malformations: in these cases postnatal treatment may be efficiently programmed.
- to prepare the mother for early cesarean section, thus avoiding the trauma of vaginal delivery in cases of high risk such as fetuses with hydronephrotic kidneys.

Thus, together with more experience in the field of intra-uterine microsurgery, the outlook on the future of fetuses with malformations is certainly becoming brighter.

**Keywords:** Ecographic diagnosis, perinatal treatment, urinary tract abnormalities.

## Zusammenfassung

### Bedeutung der pränatalen Diagnose von Harnwegsmissbildungen für das perinatale Management

Die Ultraschalluntersuchung ist eine geeignete und wenig invasive Methode zur pränatalen Diagnose von Harnwegsmissbildungen. Sie erlaubt eine Unterscheidung zwischen Missbildungen, die nicht mit dem Leben vereinbar sind und solchen, die von einem adäquaten, pränatalen Management profitieren können und so ein lebensfähiges Kind ermöglichen.

Während der letzten 3 Jahre wurden 13 Fälle mit Missbildungen des Harntraktes diagnostiziert und behandelt. Auf der Basis unserer Erfahrungen glauben wir, daß Ultraschalluntersuchungen speziell indiziert sind, um

- eine frühe Diagnose der Art der Missbildung zu treffen;
- bei multiplen Missbildungen dem Arzt die Möglichkeit zu geben, den Eltern alle Aspekte, die bei rekonstruie-

renden, chirurgischen Eingriffen berücksichtigt werden müssen, aufzuzeigen und zu erklären; die Eltern können sich dann für oder gegen eine Interruptio entscheiden;

- latente Missbildungen aufzudecken; in diesen Fällen kann eine effiziente postnatale Behandlung geplant werden;
- die Mutter auf eine frühzeitige Sectio vorzubereiten; so wird in Fällen mit hohem Risiko wie z.B. Feten mit Hydronephrose das Trauma einer vaginalen Entbindung vermieden.

Im Zusammenhang mit einer größeren Erfahrung auf dem Gebiet der intrauterinen Mikrochirurgie gestaltet sich ein Blick in die Zukunft hinsichtlich fetaler Missbildungen sicherlich optimistischer.

**Schlüsselwörter:** Harnwegsmissbildungen, perinatale Behandlung, Ultraschalldiagnostik.

## Résumé

### Rôle du diagnostic prénatal pour la prise en charge périnatale des anomalies du tractus urinaire

L'utilisation de l'échographie est une des techniques les plus appropriées et les moins invasives pour identifier en diagnostic prénatal les anomalies du tractus urinaire.

Cette technique permet de faire la distinction entre les malformations incompatibles avec la vie et celles qui peuvent bénéficier d'une prise en charge appropriée programmée en vue d'une évolution favorable après la naissance. Nous avons découvert et traité 13 cas d'anomalies du tractus urinaire au cours des 3 dernières années.

En nous fondant sur notre expérience, nous croyons que l'échographie est tout particulièrement indiquée:

- pour faire un diagnostic précoce du type de malformation;
- pour donner au clinicien, en présence d'une malformation complexe, la possibilité de motiver et d'expliquer

aux parents tous les aspects impliqués dans la chirurgie réparatrice ce qui leur donne la possibilité de décider oui ou non d'un avortement;

- pour mettre en évidence des malformations latentes; c'est dans ces cas que le traitement post-natal peut être programmé avec efficacité;
- pour préparer la mère à une césarienne précoce et éviter ainsi le traumatisme d'un accouchement par voie basse dans les cas à hauts risques tels que les fœtus présentant une hydronephrose.

Ainsi, grâce, en outre, à une plus grande expérience dans le domaine de la microchirurgie intra-utérine, l'avenir des fœtus présentant des malformations est certainement en train de devenir plus favorable.

**Mots-clés:** Anomalies du tractus urinaire, diagnostic échographique, traitement périnatal.

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# **Prolactinomas**

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The diagnosis of prolactin-producing pituitary adenomas — a cause of amenorrhea and galactorrhea in women and of impotence in men — has only become possible in recent years with new diagnostic developments in endocrinology and radiology. Although neurosurgical operative treatment of pituitary adenomas has become a low-risk intervention, the feasibility of medical treatment with dopamine agonists has made the discussion regarding indications for the use of one or the other type of treatment very complex. In this volume, opinions from all disciplines involved in this field are brought together to give the reader a view of the present state of the art. Data based on the expertise of endocrinologists, gynecologists and neurosurgeons is presented.

## **Topics:**

Adenoma or Hyperplasia — new diagnostic approaches · Ultrastructure · Cytochemistry · Endocrinology · Surgical Aspects · Conservative management — pharmacotherapy · Irradiation · Prolactin — producing mixed adenomas · Frequency of recurrency · Prolactinoma in male · Prolactinoma and infertility · Management in pregnancy



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